CLAIMS

1. A ion implantation system comprising:

an ion beam source capable of generating an ion beam;

an electrode associated with the ion beam source and positioned so that the ion beam passes therethrough; and

a gas supply constructed and arranged to introduce gas into a region defined, at least in part, by the electrode.

2. The system of claim 1, wherein the electrode comprises an extraction electrode.

3. The system of claim 1, wherein the electrode is grounded.

4. The system of claim 1, wherein the electrode is shaped to confine the gas introduced into the region.

5. The system of claim 4, wherein the electrode includes an inwardly tapered end.

6. The system of claim 1, wherein the electrode is secured to a manipulator assembly.

7. The system of claim 6, wherein a second electrode is secured to the manipulator assembly.

8. The system of claim 1, wherein an inlet to the region is formed in the electrode.

9. The system of claim 8, wherein the inlet is constructed and arranged to introduce gas into the region in an upstream direction.

10. The system of claim 1, further comprising a dopant gas supply connected to the ion beam source.

11. The system of claim 1, further comprising a flow controlling device constructed and arranged to control the flow of gas from the gas supply.

12. The system of claim 1, wherein the flow rate of gas from the gas supply is less than about 2.5 cm^3 (STP)/min.

13. The system of claim 1, wherein the gas supply is constructed and arranged to introduce an inert gas into the region.

14. The system of claim 1, wherein the gas supply is constructed and arranged to introduce a gas selected from the group consisting of dry nitrogen, xenon and argon.

15. The system of claim 1, wherein the gas comprises neutral species.

16. An ion implantation system comprising:

an ion beam source capable of generating an ion beam;

a housing downstream of the ion beam source and positioned so that the ion beam passes therethrough; and

a gas supply constructed and arranged to introduce gas into a region defined, at least in part, by the housing.

17. The ion implantation system of claim 16, wherein the housing comprises an electrode.

18. The ion implantation system of claim 16, wherein the housing is not connected to a voltage source.

19. The ion implantation system of claim 16, wherein the housing is proximate to the ion beam source.

20. The ion implantation system of claim 19, wherein the housing is upstream of the acceleration/deceleration column.

21. An ion implantation system comprising:

a dopant gas supply;

an ion beam source connected to the dopant gas supply and capable of generating an ion beam from the dopant gas;

an extraction electrode associated with the ion beam source and positioned so that the ion beam passes therethrough; and

a secondary gas supply constructed and arranged to introduce gas comprising neutral species into a region defined, at least in part, by the extraction electrode.

22. A method of generating an ion beam comprising:

generating an ion beam using an ion beam source; and

introducing a gas into the ion beam within a region defined, at least in part, by an electrode associated with the ion beam source and through which the ion beam passes.

23. The method of claim 22, wherein introducing the gas into the ion beam neutralizes the ion beam.

24. The method of claim 23, wherein the ion beam is neutralized to a substantially neutral space charge.

25. The method of claim 22, wherein the electrode comprises an extraction electrode.

26. The method of claim 22, wherein the electrode is grounded.

27. The method of claim 22, further comprising controlling the rate of introduction of the secondary gas into the ion beam.

28. The method of claim 27, wherein rate of introduction of the secondary gas into the ion beam is less than about 2.5 cm^3 (STP)/min.

29. The method of claim 22, further comprising supplying a dopant gas to the ion beam source.

30. The method of claim 22, further comprising accelerating the ion beam to an energy of less than about 10 kV.

31. The method of claim 30, further comprising accelerating the ion beam to an energy of less than about 5 kV.

32. The method of claim 22, wherein the gas comprises an inert gas.

33. The method of claim 22, wherein the gas comprises a gas selected from the group consisting of dry nitrogen, xenon and argon.

34. The method of claim 22, wherein the gas comprises neutral species.